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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/115,331	07/14/1998	THOMAS MOSSBERG	EWG-063-C	1260

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EXAMINER

CHANG, AUDREY Y

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 04/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/115,331

Applicant(s)

MOSSBERG ET AL.

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 112

- The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

- Claim 15 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification also fails to adequately teach as to why would the plurality of subgratings be capable of “applying a specified temporal waveform onto an input optical field” as recited in claim 15. Since the specification only gives support for the diffractive subgratings to impart a transfer function to the input signal.

Claim Objections

- Claims 1-16 are objected to because of the following informalities:

The applicant is respectfully informed that the claims as stand now contain numerous errors, confusions and indefiniteness. The examiner can only point out a few. *It is applicant's responsibility to clarify ALL of the discrepancies in the claims to make the claims in comply with the requirements of MPEP.* The applicant is respectfully advised that the claims as stand now are drawn to describe a *common diffraction effect* that is true for any diffraction grating and in fact the features claimed are considered to be the definition of diffraction effect for any diffraction grating. The applicant needs to really study to figure out to clearly, positively and correctly draft the claims to show the novelty, if any, of the instant invention.

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Claim 2 vague and indefinite. For one thing, all of the *symbols* used in the equation *needed* to be positively identified. The following symbols, $T(v)$, $F(V)$, V , β , d , x_1^a therefore needed to be positively defined. The phrases “substrate thickness” and “superimposed phase mask” recited in claim 2 are vague and indefinite since such phrases are *not positively defined* and it is not clear *how* do they relate to the diffractive structure. The phrase “in the sense” recited in claim 2 is vague and indefinite since it is not sure what does it mean. The phrase “the phase of a_i sets a combination of x_i and ϕ_i ” is to be vague and indefinite since it is not clear what does it mean by “set”.

The phrase “the input optical field” recited in claims 3 and 4 is vague and indefinite since it lacks proper antecedent basis. The phrase “a particular transfer function” recited in claims 3 and 4 is vague and indefinite since it is not clear how does this transfer function relate to the transfer function recited in the earlier part of the claims.

The symbols recited in claim 5 as subgrating parameters are not defined which render the scope of the claim unclear. The phrase “optical data streams” recited in claim 5 is indefinite since it is not clear how does this term relate to the rest elements of the claim.

The phrases “the spatial placement” recited in claim 6, “the optical thickness” recited in claim 8 and “the addition of active devices as known in the art” recited in claim 9 each vague and indefinite since they each lacks a proper antecedent basis from their base claim.

The alternative expression “by variation of substrate thickness, addition of segmented phase masks or other means known in the art” recited in claim 8 is vague and indefinite since the alternative elements recited here are not equivalent to each other which therefore renders the scope of the claim unclear. The phrase “other means known in the art” is simply indefinite.

Claim 9 appears to be confusing and indefinite since it is not clear what is being claimed here. The phrase “known in the art” again is indefinite. It is also not clear what is being changed here. The scope of claim is completely unclear.

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The phrase “to map the input spatial wavefront onto a desired output spatial wavefront” recited in claim 13 is vague and indefinite since it is not clear what does it mean by “map” and how could the physical shape of a diffractive structure be able to map the wavefront of input to output optical fields.

The term “said light” recited in claim 15 is vague and indefinite since it lacks proper antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

- The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

- **Claims 1, 3, 4, 6-8, 10, 12, 14, 15 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by the patent issued to Yariv (PN. 5,832,148).**

Yariv teaches a wavelength multiplexing waveguide filter wherein the waveguide (206) comprises a *diffractive structure* having a plurality of *gratings* (207, 208 and 209) that serves as the plurality of *subgratings*. Each of the plurality of gratings comprises a *periodic array of diffraction elements* and these gratings are spatially distinct from each other, (please see Figure 2). Yariv teaches that the diffractive structure having the plurality gratings are programmable to spatially and spectrally filter optical signals having temporal waveforms, (please see Figures 2-5). It is inherently true that the diffractive structure defined by the plurality of gratings has a *spectral filtering function or a transfer function*. The transfer function is to be imparted to the input signal when the input signal enters and

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passes through the structure and to create an *output* signal having a *wavefront that is equal to the multiplication of the transfer function and the input signal*. This reference however does not teach explicitly that the transfer function is complex valued. However such feature is *implicitly* met by the disclosure since it is well known in the art that the transfer function of any diffractive structure is represented by the expression of $A(r) * \exp(i\phi(r))$, with $A(r)$ and $\phi(r)$ representing the amplitude modulation and phase modulation to an incident optical field by the diffractive structure. The function $\exp(i\phi(r))$ in general is a complex function, which therefore suggests that the transfer function is a complex function. Yariv teaches that the input optical field is filtered by the diffractive structure to create a filtered output optical field, (please see Figure 3A).

With regard to claims 3, 4 and 16, Yariv teaches that the incident or input optical field may have a temporal waveform and this suggests that the output optical signal also have a temporal waveform. It is implicitly true that the transfer function is defined by the cross correlation function of the input optical field and a reference waveform. This means that the filtered version of the input optical field is the reference optical waveform.

With regard to claims 6-8, it is implicitly true that the transfer function of the diffractive structure is controlled by the amplitude, the spatial positions of the gratings and the optical thickness of the gratings since the transfer function is defined by such factors.

Yariv teaches that the diffractive structure having the plurality of gratings is of transmission mode. The diffractive structure having the plurality of diffractive gratings appears to comprise a planar surface.

The features concerning the methods of modulating the input signal or optical field by passing such optical field through the waveguide filter having a plurality of diffraction gratings are met by the disclosure of Yariv as demonstrated by Figures 3A and 3B etc.

This reference has therefore anticipated the claims.

Claim Rejections - 35 USC § 103

- The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

- **Claims 2, 9, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Yariv.**

The waveguide filter, taught by Yariv, having a diffractive structure that is comprised of a plurality of diffractive gratings as described for claim 1 above has met all the limitations of the claims. This reference however does not teach explicitly that the phase and amplitude of each of the gratings is given by the equation claimed. However the equation as claimed in claim 2 is indefinite for the reasons stated above. This feature therefore cannot be examined. The feature recited in claim 9 is also indefinite for the reasons stated above and it also cannot be addressed here.

With regard to claim 11, this reference does not teach explicitly that the diffractive grating may also be of reflection mode for producing reflected optical signal. However since both reflection mode and transmission modes of diffractive gratings are all well known in the art it would have been an obvious modification to one having ordinary skill in the art to modify the gratings to be of a reflection mode for the benefit of providing a reflective diffractive structure.

With regard to claim 13, this reference also does not teach explicitly that the diffractive structure has a non-planar surface shape for mapping the wavefront of the input field to the output field. However since this feature is indefinite for the reasons stated above. It can only be addressed broadly as follows. It is obvious in the art that the physical shape of the gratings contributes to define the transfer function it

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therefore can be modified by one skilled in the art for the purpose of obtaining desired transfer function for the diffractive structure.

- **Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Yariv in view of the patent issued to Jalali et al (PN. 5,793,907).**

Jalali et al teaches a *code division multiple access system* (CDMA) that is comprised of a *phased arrayed waveguide grating*, serves as the plurality of segmented subgratings for imparting different time delay to input optical signal having a plurality of wavelength components to create time coded optical signal. The time coded optical signal is then passing through another (or the same as in Figure 10) phased arrayed waveguide grating for creating a temporal output signal, (please see Figures 1, 6 and 10). This reference however teaches that the input signal is demultiplexed and then multiplexed, but not multiplexed then demultiplexed, by the phased arrayed waveguide grating to create the time coded output signal. Yariv in the same field of endeavor teaches that the input optical signal having a plurality of wavelength components is multiplexed and then demultiplexed by the waveguide diffractive structure, (please see Figure 3A), having a plurality of subgratings, (207, 208 and 209) so that different components of the output signal are spatially separated into different direction. It would then have been obvious to one skilled in the art to apply the teachings of Yariv to modify the code division multiple access system to have multiplex/demultiplex arrangement so that the components of the output signal having different time code can be spatially separated and directed.

Double Patenting

- The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

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A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

- Claims 1-4 and 6-16 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2 of U.S. Patent No. 6,314,220. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim a diffractive structure having plurality of subgratings.
- Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 703-305-6208. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.
- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on 703-308-1637. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.
- Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Audrey Y. Chang
Primary Examiner
Art Unit 2872

A. Chang, Ph.D.
April 28, 2003